Advertising Segment Routing Policies in BGP

draft-ietf-idr-segment-routing-te-policy-04

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Agenda

- Share updates with the WG
  - Last update was presented at IETF-98
  - Latest update submitted as revision 04 prior to IETF-102
- Collect feedback/comments from the WG
• This draft defines signaling of Segment Routing Policies via BGP protocol
• BGP Signals a Candidate Path of a given SR Policy
• A new SAFI (SR-Policy, code 73) is defined in this draft
  • Identification of the SR Policy is encoded in NLRI bits
  • Details of the SR Policy Candidate Path are encoded in the SR Policy TLV within Tunnel Encapsulation attribute
• Defines extensions to the Color Extended Community to achieve Automatic Steering

SR Policy SAFI NLRI:
<Distinguisher, Policy-Color, Endpoint>
Attributes:
Tunnel Encaps Attribute (23)
Tunnel Type (15): SR Policy
  Binding SID
  Preference
  Priority
  Policy Name
  Explicit NULL Label Policy (ENLP)
Segment List
  Weight
  Segment
  Segment
  ...
  ...
Summary of Updates

- Updates to the Segment Types
  - Correction in SID type 3 and 8 definitions
  - Addition of segment 9, 10, 11 to cover SRv6 segments
- Addition of new sub-TLVs
  - SR Policy Symbolic name sub-TLV
  - SR Policy Priority sub-TLV
  - ENLP sub-TLV
- Addition of SR Flex Algorithm specification in Segment Type sub-TLV
  - Type 3, 8 refer to the Segments with IP Prefix
  - Head-end calculates the SR SID corresponding to the prefix
  - Addition of SR Algorithm ID to indicate Head-End to calculate the Flex-Algo SID
- Addition of new flags in Segment Type sub-TLV
  - V-Flag: Enable Verification of the SID supplied by the controller
  - A-Flag: Enable SR Algorithm
- Addition of new flags to Binding SID
  - S-Flag: “specified-BSID-only” behavior
  - I-Flag: “Drop upon Invalid” behavior
- Other updates

SR Policy SAFI NLRI:
<Distinguisher, Policy-Color, Endpoint>

Attributes:
- Tunnel Encaps Attribute (23)
- Tunnel Type (15): SR Policy
- Binding SID
- Preference
- Policy Name
- Explicit NULL Label Policy (ENLP)
- Segment List
  - Weight
  - Segment
  - ...
  - ...

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Other updates

• Next-Hop address length specification to cover IPv4 or IPv6 next-hop in both SAFIs
• Defaults for Policy Preference, Weight parameters
• Updates to align terminology and the section references post WG adoption of SR Policy Architecture doc
• Updates to the Error handling text in few sections
  • Malformed sub-TLVs
  • Duplicate sub-TLVs
  •Clarification on Mandatory and optional sub-TLVs
• Editorial corrections
Next Steps

- Address any comments
- IANA code points assignments for newly defined sub-TLVs and Flags
- Request for WGLC subsequently
Backup (sub-TLV details)
New Sub-TLVs (Policy Priority)

• Policy Priority sub-TLV
• An operator MAY set the Policy Priority sub-TLV to indicate the order in which the SR policies are recomputed upon topological change
New Sub-TLVs (Policy Name)

• Policy Name sub-TLV
• An operator MAY set the Policy Name sub-TLV to attach a symbolic name to the SR Policy candidate path
New Sub-TLVs (ENLP)

- Explicit Null Label Policy (ENLP) sub-TLV
- An operator MAY set the ENLP sub-TLV to indicate whether an Explicit NULL Label [RFC3032] must be pushed on an unlabeled IP packet before any other labels
SR Algorithm

- SR Flex Algorithm Flag (A-Flag)
- An operator MAY signal this flag with the Segment Type and supply a SR Algorithm ID.

```
| 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 |
+---------------------------------------------+
| Type | Length | Flags | SR Algorithm | IPv4 Node Address (4 octets) | SID (optional, 4 octets) |
+---------------------------------------------+
```
New Segments

- Type 9: IPv6 Node Address with optional SID for SRv6
- Type 10: IPv6 Address + index for local and remote pair with optional SID for SRv6
- Type 11: IPv6 Local and Remote addresses for SRv6

### Type 9:

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

```
+----------------------------------+
| Type | Length | Flags | SR Algorithm |
+----------------------------------+
// IPv6 Node Address (16 octets)
// SID (optional, 16 octets)
```

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Segment Flags

• Segment Flags encode the per Segment behavior

• V-Flag : Segment Verification is performed on Head-end

• A-Flag: SR Flex Algorithm is used for SID calculation
Binding SID Flags

- **S-Flag**: Enable “Specified-BSID-only” behavior on Head-End

- **I-Flag**: Enable “Drop Upon Invalid” behavior on Head-End